

## CLAIMS

1. A sealing device (1) for temporarily closing a well or a pipe, the device comprising a support (2a-2b; 4, 40a-40b) supporting an inflatable tubular membrane (3) of circular section, having a wall (30) of material that is leakproof, flexible and elastic, and deformable radially outwards under the action of internal fluid pressure so as to be pressed hermetically against the wall (T) of the well or the pipe, said membrane (3) being mechanically reinforced by at least one sheet of flexible strands (6, 7) embedded in the thickness of its wall, the sheet being inscribed in a circularly cylindrical surface on the same axis as said membrane, the device being characterized by the fact that it includes at least one fiber layer (8, 9), referred to as a "filter" layer, which is likewise circularly cylindrical in shape, and disposed concentrically, being embedded in the thickness of the wall (30) of the membrane (3), inside relative to said sheet of flexible strands (6; 7), said filter layer (8, 9) possessing a structure made up of a multitude of very fine fibers (80,90) that acts as an anti-extrusion barrier, adapted to limit creep of the material constituting the wall (30) of the membrane (3) and to prevent it from passing outwards between the reinforcing strands (6, 7) under the effect of the pressure ( $P_i$ ) generated by the inflation fluid.

2. A sealing device (1) for temporarily closing a well or a pipe, the device comprising a support (2a-2b; 4, 40a-40b) supporting an inflatable tubular membrane (3) of circular section, having a wall (30) of material that is leakproof, flexible and elastic, and deformable radially outwards under the action of internal fluid pressure so as to be pressed hermetically against the wall (T) of the well or the pipe, said membrane (3) being mechanically reinforced by at least one sheet of flexible strands (6, 7) embedded in the thickness of its wall, the sheet being inscribed in a circularly cylindrical surface on the same axis as said membrane, the device being characterized by the fact that it includes at least

one pair of adjacent fiber layers (8, 9), referred to as "filter" layers, which are likewise circularly cylindrical in shape, and are disposed concentrically one inside the other, being embedded in the thickness of the wall (30) of the membrane (3), inside relative to said sheet of flexible strands (6; 7), said pair of filter layers (8, 9) possessing a structure made up of a multitude of very fine fibers (80,90) that acts as an anti-extrusion barrier, adapted to limit creep of the material constituting the wall (30) of the membrane (3) and to prevent it from passing outwards between the reinforcing strands (6, 7) under the effect of the pressure ( $P_i$ ) generated by the inflation fluid.

3. A sealing device according to claim 1, characterized by the fact that the filter layer(s) (8, 9) is/are made up of a multitude of very fine fibers (80, 90) which extend parallel to one another forming a helix of very long pitch, in a direction that is inclined at a small angle relative to the axis of revolution ( $Z-Z'$ ) of the membrane (3).
4. A sealing device according to claims 2 and 3 in combination, characterized by the fact that the fibers (80, 90) constituting the two filter layers (8, 9) are inclined at the same acute angle ( $\beta_0$ ) relative to said axis of revolution ( $Z-Z'$ ) of the membrane (3), but in opposite directions.
5. A sealing device according to claim 4, characterized by the fact that the acute angle ( $\beta_0$ ) formed by the fibers (80, 90) relative to said axis of revolution ( $Z-Z'$ ) lies in the range  $5^\circ$  to  $15^\circ$ .
6. A sealing device according to any one of claims 3 to 5, characterized by the fact that said fibers (80, 90) are made of a material having high traction strength, such as, in particular, fibers of aramid resin, carbon, or glass.
7. A sealing device according to claim 6, characterized by the fact that said fibers (80, 90) are circular in section with a diameter lying in the range about 5  $\mu\text{m}$  to 20  $\mu\text{m}$ , and preferably in the range 10  $\mu\text{m}$  to 12  $\mu\text{m}$ .
8. A sealing device according to claim 7, characterized by the fact

that the packing density of said fibers (80, 90) in a cross-section plane is about 10,000 fibers per mm<sup>2</sup>.

9. A sealing device according to any preceding claim, characterized by the fact that each of said filter layers (8, 9) possesses thickness of about 0.4 mm to 0.8 mm.